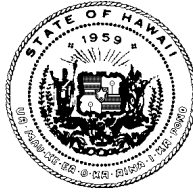


LINDA LINGLE  
GOVERNOR OF HAWAII



**STATE OF HAWAII  
DEPARTMENT OF HEALTH**

P.O. BOX 3378  
HONOLULU, HAWAII 96801-3378

CHIYOME L. FUKINO, M.D.  
DIRECTOR OF HEALTH

In reply, please refer to:  
EMD / CWB

05060PMT.06c  
DATE: May 18, 2006  
NPDES PERMIT NO.: HI 0000329  
ZONE OF MIXING NO.: ZM-202

**FACT SHEET: APPLICATION FOR RENEWAL OF NATIONAL POLLUTANT  
DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND  
ZONE OF MIXING TO DISCHARGE TO THE PACIFIC OCEAN  
WATERS OF THE UNITED STATES**

**PERMITTEE: CHEVRON U.S.A. INCORPORATED**

**FACILITY: CHEVRON U.S.A. INCORPORATED  
HAWAII REFINERY**

**FACILITY ADDRESS**

Chevron U.S.A. Incorporated  
Hawaii Refinery  
91-480 Malakole Street  
Kapolei, Oahu, Hawaii 96707

**PERMITTEE MAILING ADDRESS**

Chevron U.S.A. Incorporated  
91-480 Malakole Street  
Kapolei, Hawaii 96707  
Contact: Mr. David E. Rogers  
Refinery Manager  
Telephone No.: (808) 682-5711

**PERMIT STATUS**

NPDES Permit No. HI 0000329, including the Zone of Mixing, was issued on September 13, 2001, and expired on January 31, 2006. The Permittee reapplied for an NPDES permit and Zone of Mixing on August 4, 2005. The Department of Health (Department) administratively extended the existing NPDES permit, including the Zone of Mixing, on January 30, 2006, pending the reapplication processing. The Permittee submitted comments on the Draft NPDES permit (dated February 14, 2006) on March 23, 2006. The Permittee submitted amendments to the storm water NPDES application Form 2F dated April 28, 2006. Accordingly, this Fact Sheet and the associated public notice Draft NPDES permit includes revisions base upon the Permittee's comments of March 23, 2006, and the NPDES application amendments.

The Director of Health proposes to issue a permit, including the Zone of Mixing, to discharge to waters of the state until January 31, 2011, and has included in the proposed draft permit those terms and conditions which he has determined are necessary to carry out the provisions of the Federal Clean Act, 33 U.S.C. Subsection 1251 et seq., and Hawaii Revised Statutes, Chapter 342D.

## FACILITY SETTING

### A. Facility Operation and Location

Chevron U.S.A. Incorporated operates and maintains its existing Hawaii Refinery (SIC 2911), a petroleum refining facility, located at Barber's Point, Kapolei, Oahu, Hawaii. (See Appendix I, Figure 1, for areal map showing the location of the facility.) The facility refines crude oil for the production of various petroleum products. Table 1 lists the monthly average daily production throughput of the facility.

Table 1: Chevron U.S.A. Incorporated, Hawaii Refinery  
Monthly Average Daily Production Throughput

Daily Production	Quantity Kbbl/day *
Crude Oil Throughput	55.3
Fluid Catalytic Cracker Feed	21.4
Desalter Feed	55.3
Atmospheric Distillation Feed	55.3
Vacuum Distillation Feed	29.4
Asphalt Production	1.4
Sulfuric Acid Alkylation Feed	5.4

Source: NPDES Permit Application Form 2C, dated August 4, 2005.

\* Kbbl - 1,000 barrels (one barrel is equivalent to 42 gallons).

The source water for the operation of the facility is obtained from on-site brine wells, rainfall, municipal water, crude oil shipments, and seawater used in oil displacement (see Appendix I, Figure 2 for Schematic of Water Flow). Future plans may include the use of reclaimed treated sanitary wastewater (approximately 0.58 MGD or more) for cooling tower makeup at the facility. Presently, negotiations with the Board of Water Supply (provide your) are pending, particularly on the quality of product to be provided and its effect toward the compliance with the applicable NPDES permit discharge limitations. It should be noted that Chevron's request, in the letter of August 4, 2005, for intake credits for the use of reclaimed water may not be granted based on 40 CFR 122.45(g)(4). Effluent discharge from the facility consists of once-through non-contact brine well cooling water, treated process wastewater, treated contaminated storm water runoff, and storm water runoff. The existing discharges from the facility are made from four (4) outfalls.

Outfall Serial No. 001 discharges an average flow of 2.50 mgd of once-through noncontact brine well cooling water, treated process wastewater, and treated contaminated storm water runoff. The process wastewater that may be present in the effluent from Outfall Serial No. 001, at any one time, are listed as follows:

- Municipal water.
- On-site brine well water for sodium zeolite softener regeneration.
- Rainfall.
- Water received with crude oil shipments.
- Ship ballast water.
- Seawater used in oil displacements of the marine terminal transfer pipeline.
- Tank and pipeline hydrotest water.
- Tank waterdraws from oil recovery tanks (on and offsite).
- Water generated by purging groundwater wells.
- Chevron marketing operations: tank waterdraws, washdown water from terminals and service stations, tank washdown from cleaning, groundwater cleanup wastewater, and storm water.
- Oil contaminated water from an oil spill.
- Process sample analysis residuals and laboratory equipment cleaning water.
- Maintenance area cleaning washdown which may contain minor amounts of cleaners and degreasers.
- Fire fighting training area water.

The process wastewater streams may be treated by the following types of treatment unit processes prior to being discharged from Outfall Serial No. 001:

- Oil/Gravity Separation
- Air Oxidation and Ammonia Stripping
- Neutralization
- Auxiliary Effluent Oxidation Tank
- Aerated Lagoons
- Sedimentation Pond
- Floatation

(See Appendix I, Figure 3 for line drawing of the wastewater streams treatment processes.)

The discharge from Outfall Serial No. 001 is made into the Pacific Ocean via a 1,200 feet long Outfall at an average depth of 18 feet. Outfall Serial No. 001 is located at coordinates: Latitude 21°18'28"N; Longitude 158°07'21"W.

Once-through non-contact brine well cooling water passing through coolers for the liquified petroleum gas process is discharged to the Pacific Ocean through Outfall Serial No. 002 at a depth of three (3) feet. The Outfall Serial No. 002 discharges an average flow of 1.440 mgd and is located at coordinates: Latitude 21°18'57"N; Longitude 158°07'15"W.

Outfall Serial No. 003 intermittently discharges storm water runoff from approximately 24 acres of primarily unpaved surfaces within the facility. The area associated with Outfall Serial No. 003 is used for storage of scrap equipment and metal for maintenance activities. The Outfall Serial No. 003 discharge enters the Pacific Ocean at coordinates: Latitude 21°18'36"N; Longitude 158°07'02"W.

Outfall Serial No. 004 intermittently discharges storm water runoff from roadways (both paved and unpaved) located at the southwest corner of the Refinery. However, in the event of heavy rainfall (> 3 inches in 24 hours) storm water runoff from the East/West pipeway, cooling tower, and flare areas may also be discharged from Outfall Serial No. 004. The Outfall Serial No. 004 discharge enters the Pacific Ocean at coordinates: Latitude 21°18'32"N; Longitude 158°07'00"W.

(See Appendix I, Figure 4 for areal map showing the location of Outfall Serial Nos. 001, 002, 003, and 004.)

**B. Receiving Water Classification**

The Pacific Ocean receiving waters for the four (4) Outfalls is designated a "Class A, Dry Open Coastal Water " under Section 11-54-6(b)(2)(B), HAR. Protected beneficial uses of Class A waters include recreation, aesthetic enjoyment, and the protection and propagation of fish, shellfish and wildlife.

**C. Zone of Mixing Designation**

Chevron U.S.A. Incorporated has requested that the existing Zone of Mixing for the assimilation of the discharge from Outfall Serial No. 001 be renewed. The Zone of Mixing requested, is for the assimilation of the following types of process wastewaters, at any one time: Municipal water; Non-contact brine well cooling water; On-site brine well water for sodium zeolite softener regeneration; Rainfall; Water received with crude oil shipments; Ship ballast water; Seawater used in oil displacements of the marine terminal transfer pipeline; Tank and pipeline hydrotest water; Tank waterdraws from oil recovery tanks (on and off-site); Water generated by purging groundwater wells; Chevron marketing operations: tank waterdraws washdown water from terminals and service stations, tank washdown from cleaning, groundwater cleanup wastewater, and storm water; Oil contaminated water from an oil spill; Process sample analysis residuals and laboratory equipment cleaning water; Maintenance area cleaning washdown which may contain minor amounts or cleaners and degreasers; and, Fire training area water.

The Zone of Mixing requested is that portion of the Pacific Ocean, described as the area of radius 1,500 meters (4,875 feet) about the discharge from Outfall Serial No. 001 located at coordinates: Latitude 21°18'28.2"N, Longitude 158°07'21.5"W. See Appendix II, Figure 5 for Location and Zone of Mixing Map, and, Figure 6 for details of the Outfall Serial No. 001 ocean diffuser.

The existing Outfall Serial No. 002 discharge of once-through, non-contact brine well, cooling water has been identified to potentially be applicable for the establishment of a Zone of Mixing. Accordingly, the proposed permit contains monitoring and reporting requirements to assess the necessity and possible dimensions (if granted) of the Zone of Mixing. If a Zone of Mixing is deemed necessary pursuant to the Hawaii Administrative Rules, Chapter 11-54-9(b), the permit shall be subject to modifications to establish a Zone of Mixing or as otherwise appropriate.

# DESCRIPTION OF THE PRESENT DISCHARGE

## A. Outfall Serial No. 001

Average Flow: 2.50 MGD  
 Maximum Flow: 4.23 MGD

<u>Temperature*</u>	<u>Average</u>	<u>Maximum</u>
Summer:	None Provided	None Provided
Winter:	30°C	30°C

(\* Note: Chevron stated that there is very little or no difference in seasonal temperatures.  
 Reference: NPDES application transmittal letter of August 4, 2005.)

Constituent	<u>Concentration, mg/L</u>	
	Daily Average	Daily Maximum
Biochemical Oxygen Demand (5-day)	3.7	5.3
Total Organic Carbon	4.53	11.73
Salinity (ppt) <sup>a</sup>	--	28.0
Total Suspended Solids	6.93	41.4
Ammonia (as N)	1.58	5.16
pH (pH Units)	6.63 to 8.85	
Bromide	--	57
Fluoride	--	N.D.
Nitrate-Nitrite (as N)	--	2.4
Total Organic Nitrogen (as N)	--	1.4
Oil and Grease	0.55	1.1
Total Phosphorus (as P)	--	0.065
Sulfate (as SO <sub>4</sub> )	--	2,300
Sulfide	0.01	0.03
Surfactant	--	0.120
Aluminum, Total	--	0.218
Barium, Total	--	0.0173
Boron, Total	--	6.32
Iron, Total	--	N.D.
Magnesium, Total	--	989
Arsenic, Total	--	N.D.

Constituent	<u>Concentration, mg/L</u>	
	Daily Average	Daily Minimum
Chromium, Total	--	N.D.
Copper, Total	--	N.D.
Nickel, Total	--	0.0186
Silver, Total	--	N.D.
Thallium, Total	--	N.D.
Zinc, Total	--	N.D.
Phenols, Total	0.01	0.09

Source: NPDES Permit Application Form 2C, dated August 4, 2005.

<sup>a</sup> - Salinity data from Zone of Mixing Application dated August 4, 2005.

N.D. - None Detected

B. Outfall Serial No. 002

Average Flow: 0.914 MGD

Maximum Flow: 1.051 MGD

Temperature\*

Average

Maximum

Summer:

None Provided

None Provided

Winter:

26.87°C

28°C

(\* Note: Chevron stated that there is very little or no difference in seasonal temperatures.

Reference: NPDES application transmittal letter of August 4, 2005.)

Constituent	<u>Concentration, mg/L</u>	
	Daily Average	Maximum
Biochemical Oxygen Demand (5-day)	--	N.D.
Total Organic Carbon	0.7	2.2
Total Suspended Solids	--	1.44
Ammonia (as N)	--	N.D.
pH	7.4 to 7.5	
Bromide	--	67
Fluoride	--	N.D.
Nitrate-Nitrite (as N)	--	N.D.
Total Organic Nitrogen (as N)	--	N.D.
Oil and Grease	--	N.D.
Total Phosphorus (as P)	--	N.D.
Sulfate (as SO <sub>4</sub> )	--	2,500
Sulfide	--	N.D.
Salinity (ppt) <sup>a</sup>	--	32.2
Aluminum, Total	--	N.D.
Barium, Total	--	6.80
Boron, Total	--	3.94
Iron, Total	--	N.D.
Magnesium, Total	--	1,160
Arsenic, Total	--	N.D.
Cadmium, Total	--	N.D.
Chromium, Total	--	N.D.
Phenols, Total	--	N.D.

Constituent	<u>Concentration, mg/L</u>	
	Daily Average	Daily Maximum
Copper, Total	--	N.D.
Lead, Total	--	N.D.
Nickel, Total	--	N.D.
Silver, Total	--	N.D.
Zinc, Total	--	N.D.

Source: NPDES Permit Application Form 2C dated August 4, 2005.

<sup>a</sup> - Salinity data from Zone of Mixing Application dated August 4, 2005.

B.A. - Believed Absent per applicant

N.D. - None Detected



C. Additional Effluent Water Quality Data

HAR, Chapter 11-54, Specific Water Quality Criteria Parameters

Parameter	<u>Concentration(ug/l or as specified)</u>	
	Outfall 001	Outfall 002
Total Nitrogen	3725	429
Ammonia Nitrogen	2,346	36
Nitrate + Nitrite	245	177
Orthophosphate Phosphorus	16	25
Total Phosphorus	82	34
Chlorophyll <u>a</u>	1	1
Turbidity	4 NTU	1 NTU
Total Suspended Solids	4.6	2
pH (Standard Units)	7.5	7.4
Dissolved Oxygen	5,600	5,100
Temperature	30.5°C	27.0°C
Salinity	280,000 ppm	32,200 ppm

Source: Zone of Mixing Application dated August 4, 2005.

N/A - Not Applicable per applicant.

- D. The Pacific Ocean receiving water are monitored at a total of ten (10) stations. Table 2, in Appendix II are results from the water quality monitoring of the Pacific Ocean receiving waters performed on March 8, 2005. Table 3, in Appendix II, is a summary of the geometric mean values calculated for the receiving water stations and depths for period January 1996 to November 2004. See Figure 7, Appendix II for aerial map showing the locations of the receiving water stations.

E. Outfall Serial Nos. 003 and 004 (Storm Water Runoff Discharge From Non-Process Area)

The NPDES Application Form 2F dated August 4, 2005, identified storm water discharges from the non-processing areas of the facility may occur from Outfall Serial Nos. 003 and 004.

<b>Parameter</b>	<b>Outfall Serial No. 003 Maximum Values, mg/l</b>	<b>Outfall Serial No. 004 Maximum Values, mg/l</b>
Oil & Grease	N.D.	N.D.
Biological Oxygen Demand (BOD <sub>5</sub> )	3.43	7.6
Chemical Oxygen Demand (COD)	23.3	179.0
Total Suspended Solids (TSS)	44.4	72.9
Total Organic Nitrogen	18	25.0
Total Phosphorus	0.17	0.262
pH	8.7 minimum, 9.10 maximum standard units	8.7 minimum, 9.09 maximum standard units

Source: NPDES Application Form 2F dated August 4, 2004.

N.D. - Not Detected

The NPDES Application Form 2F amendments date April 28, 2006, provided storm water runoff test results for samples taken during the storm event of February 21, 2006. Following are storm water results for the February 21, 2006, event.

<b>Parameter</b>	<b>Outfall Serial No. 003 Maximum Values, mg/l</b>	<b>Outfall Serial No. 004 Maximum Values, mg/l</b>
Oil & Grease	N.D.	N.D.
Biological Oxygen Demand (BOD <sub>5</sub> )	4.98	7.6
Chemical Oxygen Demand (COD)	46	N.D.
Total Suspended Solids (TSS)	44.4	72.9
Total Organic Nitrogen	18.7	25.0
Total Phosphorus	0.43	0.262

**FACT SHEET**  
**PERMIT NO. HI 0000329**  
**Page 11**

pH	8.7 minimum, 9.1 maximum standard units	8.91 minimum, 8.91 maximum standard units
Bromide	5.8 mg/l	5.3 mg/l
Floride	N.D.	0.59 mg/l
Nitrate-Nitrite (N)	17 mg/l	5.75 mg/l
Sulfate (SO4)	460 mg/l	520 mg/l
Aluminum Total	0.080 mg/l	0.30 mg/l
Barium Total	0.020 mg/l	0.017 mg/l
Boron Total	0.79 mg/l	1.6 mg/l
Iron Total	0.12 mg/l	0.33 mg/l
Magnesium Total	54 mg/l	32 mg/l
Titanium Total	0.0060 mg/l	0.019 mg/l
Antimony Total	N.D.	N.D.
Arsenic Total	0.0085 mg/l	0.0098 mg/l
Beryllium Total	N.D.	N.D.
Cadmium Total	N.D.	N.D.
Chromium Total	N.D.	N.D.
Hexavalent Chromium	N.D.	N.D.
Copper Total	N.D.	N.D.
Lead Total	N.D.	N.D.
Mercury Total	0.0339 ug/l	0.0362 ug/l

Source: NPDES Application Form 2F dated April 28, 2006.

N.D. - Not Detected

## PROPOSED DETERMINATIONS

### A. Effluent Limitations

The proposed effluent limitations are based on:

- Best practicable control technology currently available (BPT), best available technology economically available (BAT), and best conventional pollutant control technology (BCT) guidelines contained in 40 CFR, Part 419 - Petroleum Refining Point Source Category, Subpart B - Cracking Subcategory, promulgated October 18, 1982 and last amended August 12, 1985;
- Hawaii Administrative Rules, Title 11 - Department of Health, Chapter 54 - Water Quality Standards; adopted effective May 25, 1974; last amended effective October 2, 2004.
- Hawaii Administrative Rules, Title 11 - Department of Health, Chapter 55 - Water Pollution Control; adopted effective May 25, 1974; last amended effective October 2, 2004.

The 40 CFR 419 effluent guidelines are applied based upon the previous permit application daily production crude oil throughput of 56,400 barrels per day (bbl/day) and associated production feed rates. The present production throughput of 55,300 bbl/day and associated feeds are anticipated by Chevron to not reflect future production throughput and feed rates which will involve production throughput using less high sulfur crude and more low sulfur crude. Accordingly, the proposed effluent limitations are basically the same as established in the previous issued NPDES permit. Calculations for the application of the 40 CFR 419 effluent guidelines based on the 56,400 bbl/day throughput and associated feed rates are provided at Appendix III of this fact sheet.

1. Outfall Serial No. 001 - Treated process wastewater, once-through non-contact cooling water, and treated contaminated rainfall runoff. The development of the discharge requirements based on the 40 CFR 419 effluent guidelines are presented as follows.
  - a. Contaminated storm water runoff from the process area is commingled and treated with process wastewater.
  - b. BPT Requirements:
    - 1) BPT and BAT requirements pertaining to COD, ammonia as N and sulfide are similar. BPT and BCT requirements pertaining to BOD<sub>5</sub>, TSS, oil and grease and pH are also similar. Therefore, these parameters are addressed under BAT and BCT requirements below. However, because of differences in the methods used to determine BPT and BAT requirements pertaining to phenolic compounds, total chromium and hexavalent chromium, it is necessary to calculate both BPT and BAT requirements and compare them to determine which is more stringent.

- 2) Based on BPT requirements 40 CFR 419.22(a) pertaining to phenolic compounds, total chromium, and hexavalent chromium, the following effluent limits (see Appendix III for calculations) are calculated:

Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
Phenols	1.86	3.82
Total Chromium	4.54	7.74
Hexavalent Chromium	0.29	0.62

Note: Based on production crude oil throughput of 56,400 bbls/day.

c. BAT Requirements

- 1) Based on BAT requirements 40 CFR 419.23(a) pertaining to COD, ammonia and sulfide, the following effluent limits (see Appendix III for calculations) are calculated:

Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
Total Organic Carbon (TOC)*	624	1124
Ammonia (as N)	155	341
Sulfide	1.5	3.36

Note: Based on production crude oil throughput of 56,400 bbls/day.

- \* TOC replaces COD at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD<sub>5</sub> (see page 13 for BOD<sub>5</sub> effluent limitations); substitution based on the chloride level in the effluent which exceeds 1,000 mg/l (Note: Salinity = 33.28 ppt, see page 5).

- 2) Based on BAT requirements 40 CFR 419.23(c)(i) pertaining to phenolic compounds, total chromium and hexavalent chromium the following effluent limits (see Appendix III for calculations) are calculated:

Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
Phenols	1,435.98 <sup>1/</sup>	
Total Chromium	1.72	4.91
Hexavalent Chromium	0.14	0.31

Note: Based on production crude oil throughput of 56,400 bbls/day.

<sup>1/</sup>BPT limit = 3.82 which is more stringent.

- 3) Based on BAT requirements 40 CFR 419.23(f)(2) for treated contaminated storm water runoff the proposed effluent limits are:

	lbs/1,000 gallons of treated rainwater	
Pollutant	Daily Average	Daily Maximum
Phenols	0.0014	0.0029
Total Chromium	0.0018	0.0050
Hexavalent Chromium	0.00023	0.00052
TOC *	0.484	0.88

\* TOC replaces COD at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD<sub>5</sub> pursuant to BPT requirements of 40 CFR 419.22(e)(2).

d. BCT Requirements

- 1) Based on BCT requirements 40 CFR 419.24(a) pertaining to BOD<sub>5</sub> TSS, oil and grease, and pH the following effluent limits (see Appendix III for calculations) are calculated:

Pollutant	Daily Average, lbs/day	Daily Maximum, lbs/day
BOD <sub>5</sub>	284	511
TSS	227	356
Oil and Grease	83	155
pH	Within the range of 6.0 to 9.0	

Note: Based on production crude oil throughput of 56,400 bbls/day.

- 2) Based on BCT requirements 40 CFR 419.24(e)(2) for treated contaminated storm water runoff the proposed effluent limits are:

lbs/1,000 gallons of treated rainwater			
Pollutant	Daily	Daily Average	Maximum
BOD <sub>5</sub>		0.22	0.40
TSS		0.18	0.28
Oil and Grease		0.067	0.13
pH		Within the range of 6.0 to 9.0	

The hexavalent chromium and total chromium Daily Maximum limits of 0.29 and 4.36 lbs/day, respectively, are as established in the previous issued NPDES Permit. The phenols Daily Average limit of 1.27 lbs/day is also as established in the previous issued permit.



These limits are incorporated into the proposed permit since no Antidegradation Analysis in accordance with HAR, Section 11-54-01.1 and 40 CFR 131.12 has been completed. A successfully completed Antidegradation Analysis is required in order to incorporate the higher applicable BAT calculated limits (see Proposed Determination Part A.2.a) into the proposed permit.

4. Whole-Effluent Toxicity Limitations

The proposed whole-effluent toxicity limitation and monitoring requirements are incorporated into the permit in accordance with Title 40, Code of Federal Regulations, Subpart 122.44(d). This regulation requires water quality-based permit limits for whole-effluent toxicity where necessary to achieve State water quality standards. The State whole-effluent toxicity provisions are specified at HAR, Section 11-54-4(b)(4). The proposed whole-effluent toxicity requirements temporarily requires the testing to be conducted using the currently one (1) only suitable locally available test species, i.e., *Tripneustes gratilla*. The testing using only (1) suitable local species shall be allowed until additional local species are authorized for use under this permit. Upon the establishment of additional suitable local species, the whole-effluent toxicity testing shall then be required to be performed using two (2) local species. Alternatively, the Permittee may conduct chronic toxicity testing on two (2) mainland species found in the EPA Methods manual upon obtaining approval from the Director of Health.

a. Outfall Serial No. 001

The whole-effluent toxicity limit enforces the prohibition against discharges which are toxic to aquatic life. The Department of Health is requiring whole-effluent toxicity limitations in permits for all major discharges. This limitation is based upon the minimum discharge-induced dilution factor, 42, provided by the outfall. This minimum dilution factor was calculated with the EPA model Plume using applicable information regarding the characteristic of the discharge and outfall (See Appendix III). The limit requires that the No Observed Effect Concentration (NOEC) using a chronic toxicity test be greater than 2.38% (1/42) effluent. The chronic NOEC of 2.38% effluent limit may also be expressed as 42.0 Chronic Toxicity Units ( $TU_c$ ) by determining the reciprocal of the NOEC value. Accordingly, the chronic NOEC shall be limited whereby test results must be less than or equal to 42.0  $TU_c$ .

The previous issued NPDES permit specified that the Permittee may demonstrate compliance with the whole-effluent toxicity requirement by using either acute toxicity ( $LC_{50} \geq 71.4 \%$ ) or chronic toxicity ( $NOEC \leq 42.0 TU_c$ ) testing. As a result, the Permittee selected the use of the acute toxicity testing for the demonstration of the whole-effluent toxicity requirement. Therefore, the Permittee requested that a transitional period be allowed in order to now demonstrate compliance with the whole-effluent toxicity requirement using chronic toxicity testing. Beside time needed to implement the chronic testing, it is possible that additional treatment or practices may be needed to comply with the test. Accordingly, the Department has included a temporary

allowance to conduct acute toxicity testing to demonstrate compliance with the whole-effluent toxicity requirement for a period no longer than three (3) years after the effective date of the draft permit. This temporary allowance for the use of the acute toxicity testing is contingent upon the Permittee performing concurrent continuous efforts (which includes, but is not limited to, conducting studies, additional treatment or practices) to comply with the chronic toxicity testing limitation, and, may be revoked at any time by Director. To track the progress being made, the Department has incorporated in the draft permit a requirement that the Permittee submit by January 30 of each year, a status report of the Permittee's efforts performed toward attaining compliance with the chronic whole-effluent toxicity limitation, as applicable.

b. Outfall Serial No. 002

The permit includes a whole-effluent limitation requiring that test organisms in an undiluted toxicity test of the discharge shall not be less than 70% mean fertilization. This limitation is based upon the basic toxicity requirements for discharges without submerged outfalls specified at HAR, Section 11-54-4(b)(4)(B). The whole-effluent testing is a means to enforce HAR, Section 11-54-4(a)(4), which specifies that all waters shall be free of substances at levels or in combinations sufficient to be toxic or harmful. In addition, the proposed whole-effluent toxicity requirements are established based on comments from the EPA Region 9 Laboratories staff of April 2005 and program consistency with the Draft National Whole Effluent Toxicity Implementation Guidance dated November 2004.

Alternatively, the Outfall Serial No. 002 shoreline discharge may demonstrate compliance with whole-effluent toxicity requirement by performing an acute test where test organisms in an undiluted toxicity test of the discharge shall not be less than 80 % survival. This limitation is based upon the basic toxicity requirements for discharges without submerged outfalls specified at HAR, Section 11-54-4(b)(4)(B). The alternative acute toxicity testing shall be conducted on two (2) mainland species found in the EPA methods manual specified at Part B.1.b(3) of the draft permit.

5. Storm Water Runoff Discharges from Outfall Serial Nos. 003 and 004.

The proposed storm water runoff discharge conditions and requirements are established based on the HAR, Chapter 11-55, NPDES General Permit for Storm Water Associated With Industrial Activity, and as administered in the previous effective permit.

6. pH Effluent Limitations Under Continuous Monitoring (40 CFR 401.17) - Outfall Serial No. 001 pH Excursions

For pH effluent limitations under continuous monitoring, 40 CFR 401.17 specifies permissible pH excursions from the pH effluent limitation range due to unintentional and temporary incidents. Accordingly, this 40 CFR 401.17 pH excursion provision has been incorporated into the Outfall Serial No. 001 effluent limitation requirements at Part A.1.a, under footnote f, of the draft

permit. As part of the implementation of this provision only, the Department has presently established that temporary incidents shall be considered not more than two (2) consecutive calendar months in which pH excursions under the 40 CFR 401.17 has occurred. Hence, if more than two (2) consecutive months of pH excursions occurs the Director reserves the right to retract this pH limitation excursion provision, as deemed appropriate.

**B. Effluent Monitoring Requirements**

The Outfall Serial No. 001 effluent requirement of monitoring only has been included for total nitrogen, nitrate+nitrite, and total phosphorus to enable comparison with receiving water Zone of Mixing monitoring results. The Outfall Serial No. 001 effluent monitoring for ammonia nitrogen will also enable comparison with the receiving water Zone of Mixing results, besides determining compliance with the discharge limitation.

Chevron requested (August 4, 2005 letter) a reduction in the effluent sampling frequency for the following outfalls and associated parameters:

Outfall Serial No. 001 - BOD<sub>5</sub>, Oil and Grease, Total Sulfide, Ammonia Nitrogen, and Phenols; and,

Outfall Serial No. 002 - Temperature and Total Organic Carbon.

Chevron's request for reductions in the effluent sampling frequency are based on a history of demonstrated compliance. The Department has presently determined that the requested sampling frequency reduction shall not be granted. The facility's actual 5 year historical crude oil production throughput rates (approximately 51,200 bbl/day) have never been at or above the production throughput of 56,400 bbl/day that was used for the development of the current NPDES permit effluent limits. Therefore, the compliance history of the facility has not demonstrated compliance of the operations at or above the production throughput rates of 56,400 bbl/day that was used for the development of the existing NPDES permit limits. Also, the future production throughput and feed rates involving production throughput using less high sulfur crude and more low sulfur crude is believed by Chevron to increase the discharge characteristics levels from the facility. Hence, Chevron has requested that the existing permit limits based on the production throughput of 56,400 bbls/day be maintained. Accordingly, the current established monitoring requirements for the Chevron Hawaii Refinery, a major industrial discharger, are considered by the Department of Health to be appropriate toward ensuring that the discharge is not compromising the objectives and applicable water quality standards of the Pacific Ocean receiving waters, and not cause excessive economic burden to the Permittee.

The Outfall Serial No. 002 effluent requirement of monitoring only has been included for total nitrogen, ammonia nitrogen, nitrate+nitrite, and total phosphorus pursuant to assessing the applicability of a Zone of Mixing for the discharge.

The Outfall Serial Nos. 001 and 002 effluent requirements of monitoring only for silica will assist data interpretation and evaluation of nutrients in the receiving waters. Silica is abundantly found in Hawaiian igneous rocks. Accordingly, silica is normally present in Hawaii's groundwater. The monitoring for silica has been commonly performed in Hawaii to assess the influence of groundwater dynamics on nearshore waters. The test for silica will provide data to evaluate the net contribution of the Hawaii Refinery discharge on the receiving waters. The analysis may identify other sources of nutrients that are significant contributors toward the overall ambient receiving water quality.

The proposed petroleum refinery process wastewater, cooling water, treated contaminated storm water runoff, and storm water runoff effluent limitations and monitoring requirements are specified at Part A of the draft permit.

The whole-effluent toxicity requirements are specified at Part B of the draft permit.

C. Proposed Receiving Water Limitations and Monitoring Requirements

The evaluation and determination of the effect of the discharge on receiving water quality is based on Hawaii Administrative Rules, Title 11, Department of Health, Chapter 54, Water Quality Standards (promulgated October 2, 2004).

1. Basic Water Quality Criteria Applicable to All Waters, 11-54-4(a)
  - a. The discharge shall not cause a violation of any applicable water quality standard for receiving waters.
  - b. The discharge from the Chevron U.S.A. Incorporated, Hawaii Refinery shall not interfere with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife and allows recreational activities in and on the water (11-54-3).
2. Specific Criteria "Class A Dry Open Coastal Waters", 11-54-6(b)(3)

Parameter	Geometric mean not to exceed the given value	Not to exceed the given value more than 10% of the time	Not to exceed the given value more than 2% of the time
Total Nitrogen (ug N/L)	110.00	180.00	250.00
Ammonia Nitrogen (ug NH <sub>4</sub> -N/L)	2.00	5.00	9.00
Nitrate+Nitrite Nitrogen (ug[NO <sub>3</sub> +NO <sub>2</sub> ]-N/L)	3.50	10.00	20.00
Total Phosphorus (ug P/L)	16.00	30.00	45.00
Light Extinction Coefficient (k units)	0.10	0.30	0.55
Chlorophyll <u>a</u> (ug/L)	0.15	0.50	1.00
Turbidity (NTU)	0.20	0.50	1.00

pH units - Shall not deviate more than 0.5 units from a value of 8.1.

Dissolved oxygen - Not less than 75% saturation.

Temperature - Shall not vary more than 1°C from ambient conditions.

Salinity - Shall not vary more than 10% from natural or seasonal changes considering hydrologic input and oceanographic factors.

The discharges from Outfall Serial No. 001 shall comply with the specific water quality criteria set forth in the table above, except that the specific water quality criteria for the parameters listed below may be exceeded within the Zone of Mixing (ZM-202).

Total Nitrogen  
Ammonia Nitrogen  
Nitrate + Nitrite Nitrogen  
Total Phosphorus  
Chlorophyll a  
Turbidity  
pH  
Temperature  
Salinity

Note: The above receiving water parameters of the Zone of Mixing are as established in the previous NPDES permit.

**D. Zone of Mixing (ZM-202)**

For the assimilation of the existing Chevron U.S.A. Incorporated, Hawaii Refinery discharge in the “Class A” “Dry” “Open Coastal Waters”, a Zone of Mixing per Chapter 11-52-09 has been established.

The establishment of this Zone of Mixing is subject to the conditions specified at Part C of the draft permit. The draft permit incorporates receiving water monitoring requirements which the Department of Health has determined are necessary to evaluate compliance of the Outfall Serial No. 001 discharge with the water quality criteria. The benthic monitoring requirements is incorporated into the draft permit in accordance with HAR, Section 11-54-9(c)(6). The existing benthic monitoring requirement is maintained in the draft permit toward ensuring that no lowering in the quality of the bottom biological communities is occurring.

**E. Other Requirements**

1. The proposed schedule of submission at Part E of the draft permit specified the Permittee to submit the following items by the specified time frames to the Director of Health:
  - a. Effluent Monitoring Program within 30 days after the effective date of the permit.
  - b. Receiving Water Monitoring Program within 30 days after the effective date of the permit.
  - c. The Permittee shall submit to the Director of Health by January 31st of each year, a report of the previous calendar year monthly average production of crude throughput in barrels/day.
  - d. Receiving water bottom biological communities monitoring program within 60 days after the effective date of the permit.
  - e. Whole-Effluent Toxicity Initial Investigation Toxicity Reduction Evaluation Workplan within 90 days after the effective date of the permit.
  - f. Updated SWPCP within 90 days after the effective date of the permit.

**OCEAN DISCHARGE CRITERIA**

The Director of Health has considered the Ocean Discharge Criteria, established pursuant to Section 403(c) of the Clean Water Act for the discharge of pollutants into the territorial sea, the waters of the contiguous zone, or the oceans. The EPA has promulgated regulations for Ocean Discharge Criteria in 40 Code of Federal Regulations Part 125, Subpart M. Therefore, the Director of Health has determined that the discharge will not cause unreasonable degradation to the marine environment. Based on current information, the Director of Health proposes to issue a permit.

## **Appendix I**

**Chevron U.S.A. Incorporated**  
**Hawaii Refinery**  
**NPDES Permit No. HI 0000329**

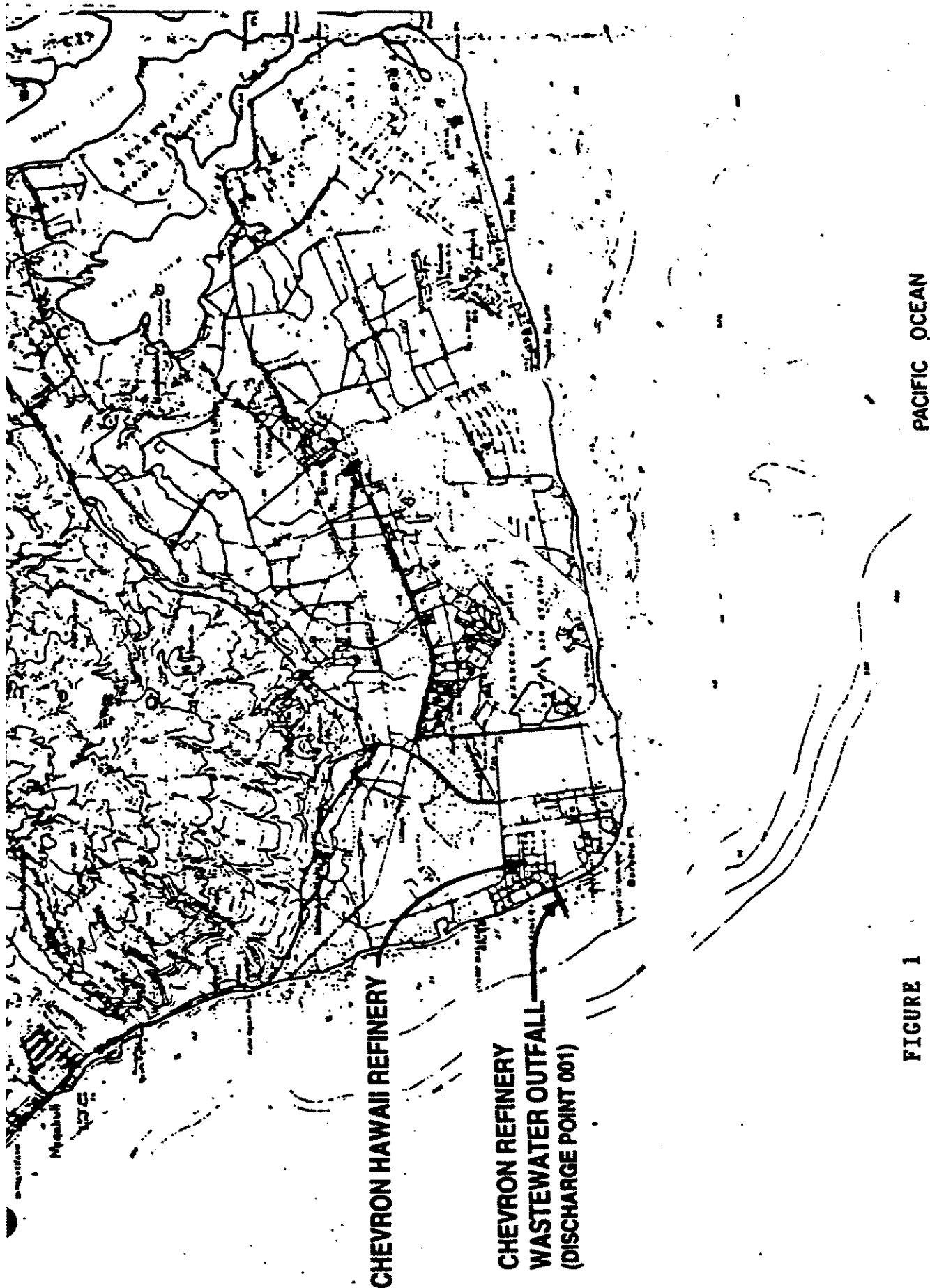
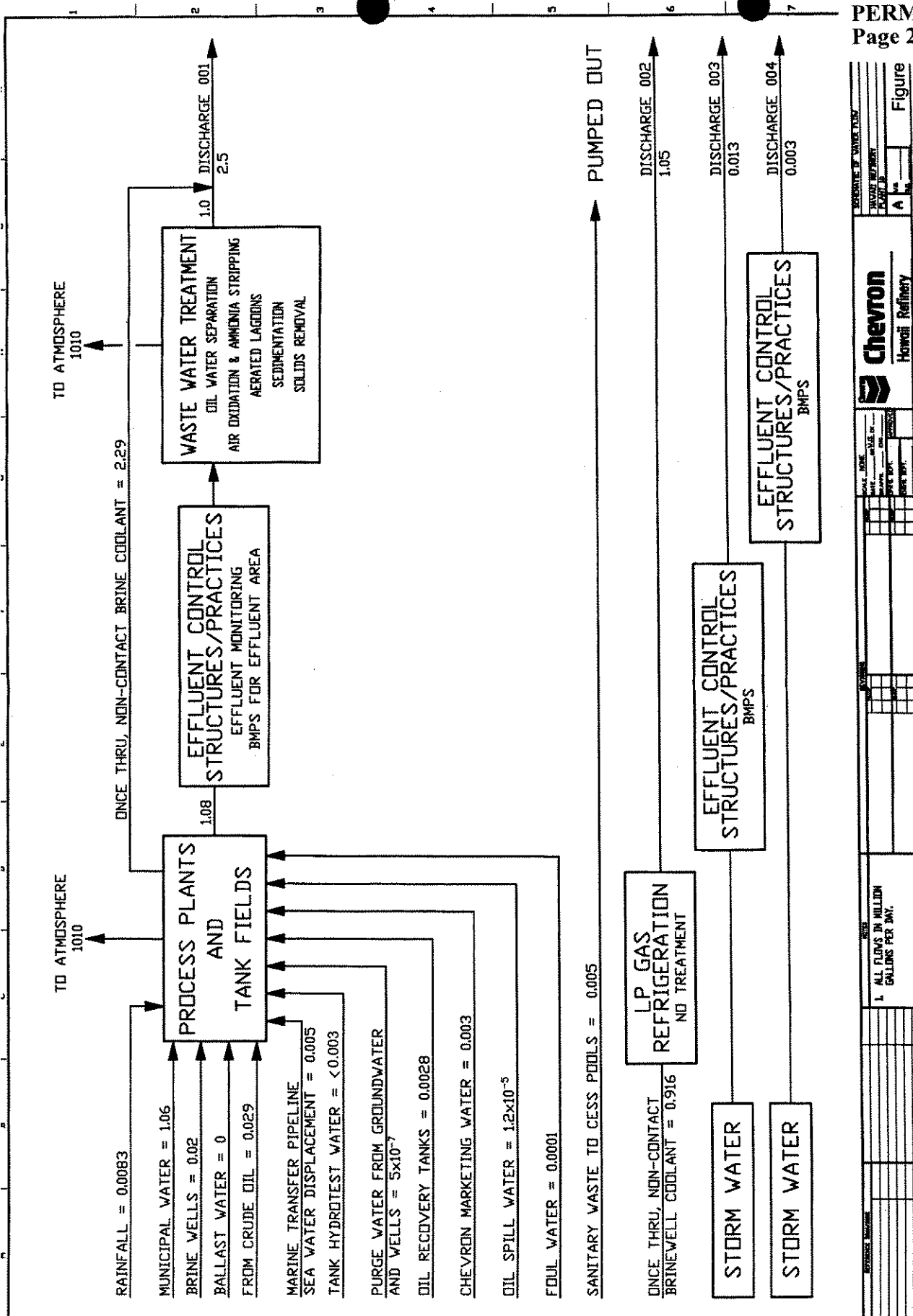


FIGURE 1





### Figure 2

[illegible]

### Figure 3

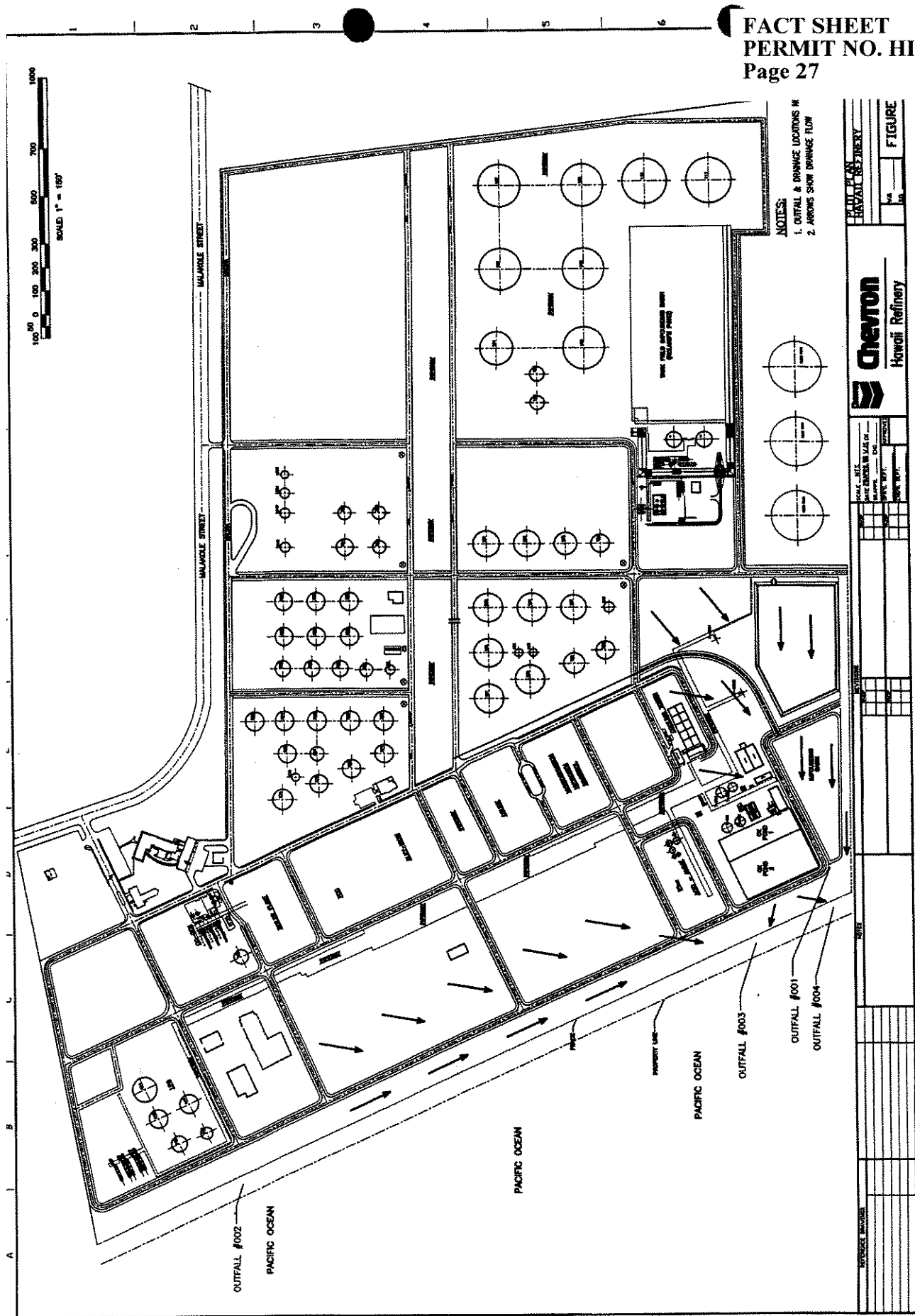


Figure 4

**APPENDIX II**

**Chevron U.S.A. Incorporated**  
**Hawaii Refinery**  
**NPDES Permit No. HI 0000329**

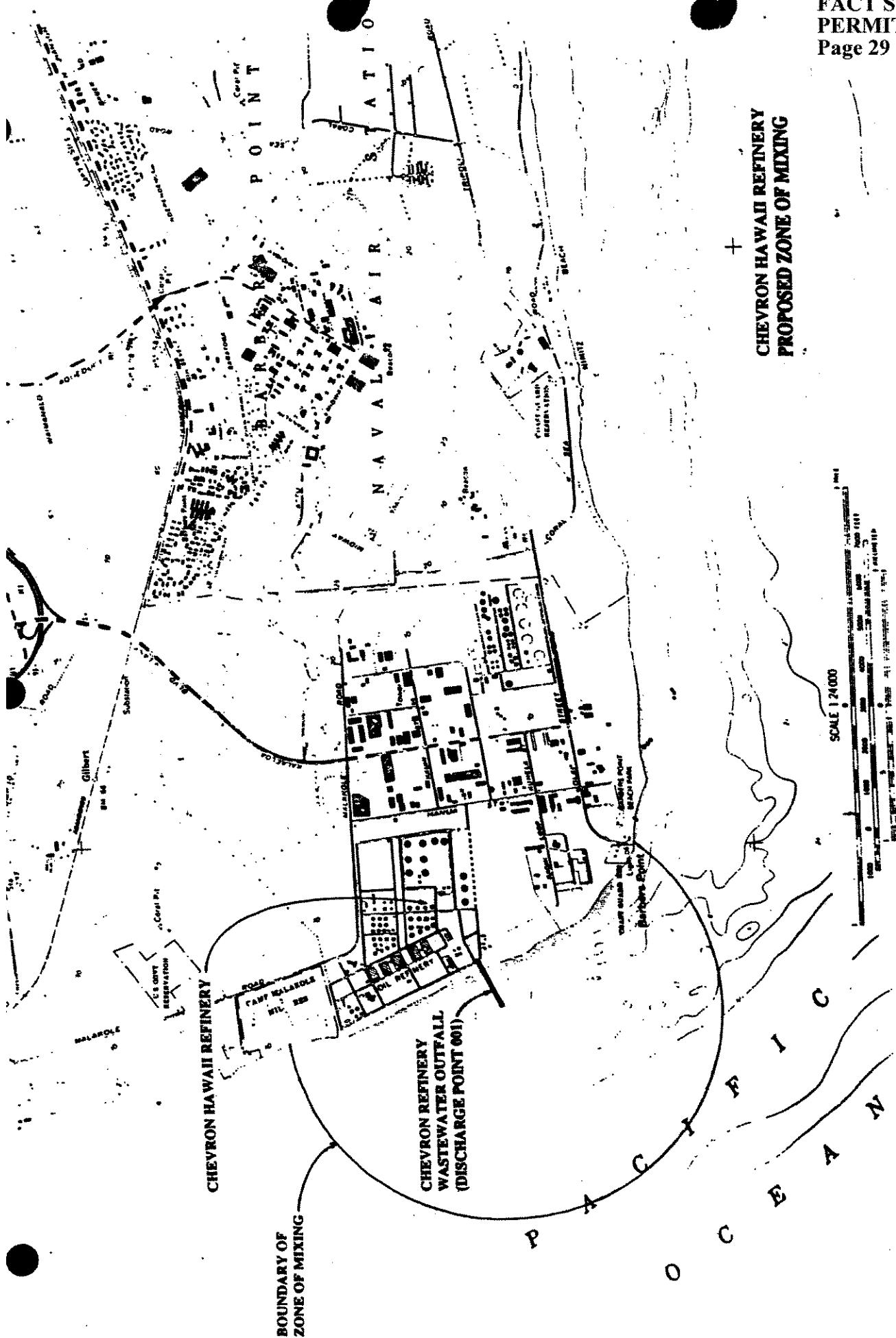


Figure 5

Appendix 2

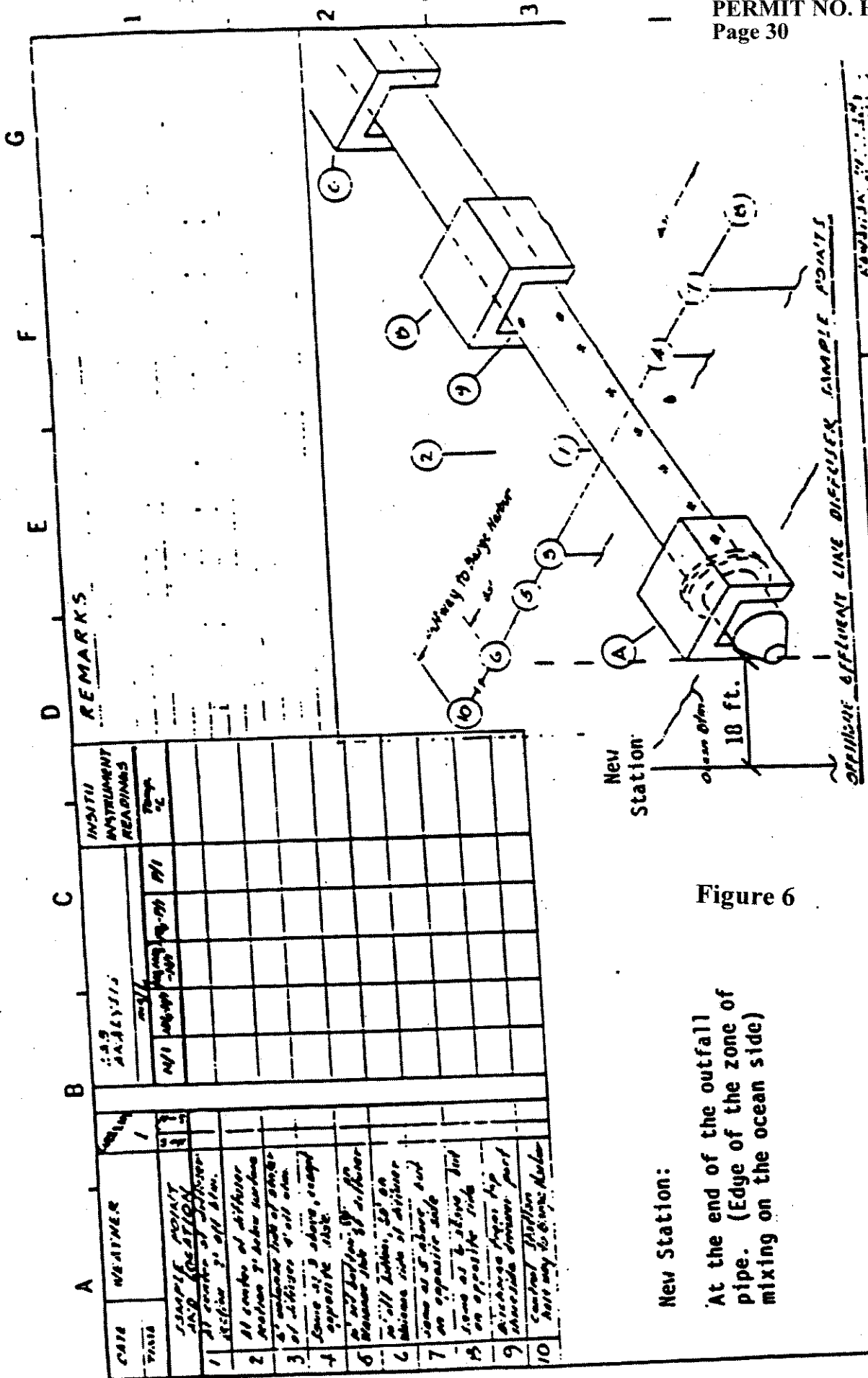


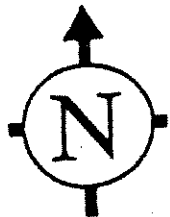
Figure 6

New Station:

At the end of the outfall pipe. (Edge of the zone of mixing on the ocean side)

DATE	TIME	WEATHER	WIND	TEMP.		WATER ANALYSIS		INSTRUMENT READINGS	
				AIR	WATER	PH	TEMP.	PH	TEMP.
		SAMPLE POINT AND LOCATION							
1		At center of diffuser							
2		At center of diffuser							
3		At center of diffuser							
4		At center of diffuser							
5		At center of diffuser							
6		At center of diffuser							
7		At center of diffuser							
8		At center of diffuser							
9		At center of diffuser							
10		At center of diffuser							

Checked by: <i>[Signature]</i> Date: <i>10/1/87</i>		Scale: <i>1" = 10'</i>	
Drawn by: <i>[Signature]</i> Date: <i>10/1/87</i>		Project No.: <i>515-36</i>	
Title: <i>NEW STATION</i>		Date: <i>10/1/87</i>	



SCALE: 1:24000  
 1"=2000 ft.

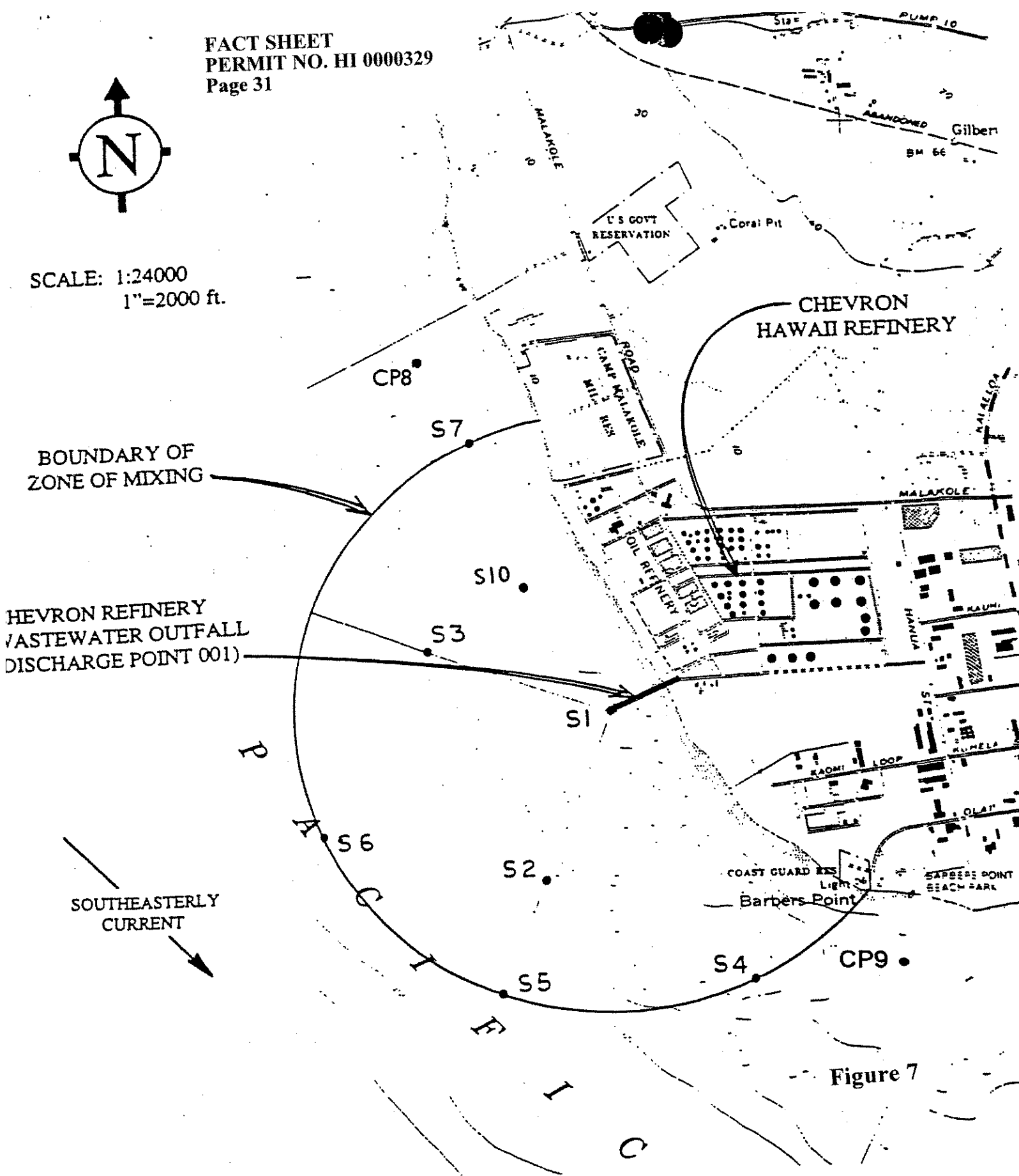


Figure 7

FIGURE I. Map of Barbers Point Area showing location of Chevron Hawaii Refinery and Zone of Mixing (ZOM) boundary. Sampling stations S1-S7 and S10 are located on the boundary of, or within the ZOM, while stations CP8 and CP9 are control stations located outside of the ZOM.

# ATTACHMENT 7

Results of water chemistry analyses from ocean sampling stations in the vicinity of the Zone of Mixing (ZOM) for the Chevron Hawaii Refinery. Samples were collected on March 8, 2005. See Figure 1 for locations of sampling stations. Samples 001 and 002 are effluent samples collected at the same time as ocean samples. Also shown are Department of Health Water Quality Standards for "open coastal waters" under "dry" conditions, "not to exceed more than 10% and 2% of the time" criteria. Shaded values indicate exceedance of 10% DOH criteria.

SAMPLE STATION	PO4 (µg/L)	NO3+NO2 (µg/L)	NH4 (µg/L)	Si (µg/L)	TP (µg/L)	TN (µg/L)	TURB (ntu)	SALT (o/oo)	pH (std. units)	Chl-a (µg/L)	TEMP deg. C	Diss. O2 % sat.
S4-T	1.24	0.84	1.12	42.43	9.61	108.92	0.19	34.892	8.16	0.26	24.93	110.6
S4-B	1.55	0.84	1.26	32.03	10.23	115.08	0.25	34.899	8.16	0.34	24.92	96.6
S5-T	1.24	0.56	0.70	29.79	9.61	107.80	0.14	34.976	8.17	0.12	24.79	109.0
S5-M	1.55	0.14	2.24	49.74	9.30	112.42	0.12	35.054	8.19	0.12	24.70	98.3
S6-T	0.93	0.28	1.12	33.44	8.99	106.12	0.13	34.926	8.19	0.09	24.75	108.5
S6-M	1.55	0.56	0.98	29.79	9.30	101.08	0.10	35.034	8.19	0.12	24.69	99.0
S7-T	2.17	3.36	1.68	39.62	9.30	98.28	0.14	34.930	8.14	0.24	24.81	108.4
S7-B	2.17	2.94	1.26	41.87	9.30	101.78	0.14	34.947	8.15	0.24	24.82	98.7
C8-T	1.55	0.70	1.12	36.25	8.99	104.72	0.11	34.907	8.18	0.17	24.73	113.9
C8-B	1.86	0.28	1.82	37.94	9.30	106.82	0.16	34.939	8.18	0.19	24.80	99.6
C9-T	1.55	1.26	1.26	32.60	9.30	112.56	0.20	34.895	8.17	0.25	24.95	109.8
C9-M	1.86	1.12	1.68	32.32	8.99	112.00	0.22	34.885	8.18	0.37	24.95	96.9
S1-T	2.17	1.82	1.40	48.61	8.99	117.74	-	34.888	8.14	-	24.79	110.7
S1-B	2.17	1.96	1.26	38.22	8.99	113.40	-	34.910	8.13	-	24.80	99.7
S2-T	1.86	0.56	1.26	29.79	9.61	100.10	-	34.905	8.17	-	24.86	113.0
S2-M	1.86	0.28	1.26	30.63	9.30	104.44	-	34.990	8.18	-	24.74	96.6
S3-T	1.24	0.70	0.56	30.63	8.99	101.22	-	34.963	8.18	-	24.80	112.0
S3-B	1.55	0.42	0.56	38.50	8.99	92.26	-	34.980	8.20	-	24.80	105.1
S10-T	2.17	1.12	2.10	42.43	9.30	112.28	-	34.905	8.14	-	24.77	115.4
S10-B	2.17	0.98	0.84	44.12	9.30	99.54	-	34.919	8.14	-	24.79	99.8
001	15.50	245	2346	5069	82.2	3725	-	27.988	7.34	-	-	-
002	24.18	177	36.12	3081	34.1	429	-	32.195	7.38	-	-	-
DOH	-	10.00	5.00	-	30.00	180.00	0.50	-	**	0.50	***	****
WQS	-	20.00	9.00	-	45.00	250.00	1.00	-	**	1.00	***	****

"bdl" = below detection limit

\* Salinity shall not vary more than 10% from natural or seasonal changes considering hydrologic input and oceanographic factors.

\*\* pH shall not deviate more than 0.5 units from a value of 8.1.

\*\*\* Temperature shall not vary more than one degree C. from ambient conditions.

\*\*\*\* Dissolved Oxygen not less than 75% saturation

Table 2



# ATTACHMENT 8

Cumulative geometric means of water quality measurements from ocean sampling stations in the vicinity of the Zone of Mixing (ZOM) of the Chevron Hawaii Refinery. Geometric means for all stations except S10 are calculated from 36 surveys from January 1996 to November 2004. Geometric means for Station S10 are calculated from 30 surveys from November 1997 to March 2005. Also shown are Dept. of Health geometric mean water quality standards (WQ stds) for open coastal waters under dry conditions. Shading indicates mean value exceeding WQ standard. See Figure 1 for locations of sampling stations.

SAMPLE STATION	NO3+NO2 (µg/L)	NH4 (µg/L)	TP (µg/L)	TN (µg/L)	TURB (ntu)	Chl-a (µg/L)
COMPLIANCE STATIONS	S4-T	0.96	11.43	127.15	0.24	0.26
	S4-B	0.68	11.62	123.97	0.24	0.28
	S5-T	0.47	11.25	122.85	0.13	0.15
	S5-M	0.46	11.59	117.35	0.12	0.16
	S6-T	0.39	11.31	121.65	0.12	0.13
	S6-M	0.33	11.19	114.76	0.11	0.15
	S7-T	2.73	11.43	122.48	0.18	0.23
	S7-B	2.59	11.65	120.42	0.18	0.25
CONTROL	C8-T	0.70	11.11	124.51	0.12	0.17
	C8-B	0.58	0.92	115.97	0.14	0.17
	C9-T	0.69	0.92	11.18	137.83	0.23
	C9-M	0.55	0.87	11.40	122.59	0.17
INSIDE ZOM	S1-T	7.35	3.17	11.50	149.77	
	S1-B	3.90	1.48	11.27	130.36	
	S2-T	0.86	0.73	11.36	122.90	
	S2-M	0.71	0.55	11.57	116.16	
	S3-T	0.87	0.72	11.62	116.61	
	S3-B	0.73	0.49	10.95	111.72	
	S10-T	2.84	0.95	10.40	122.15	
	S10-B	2.78	0.67	10.68	124.73	
DOH WQS	3.50	2.00	16.00	110.00	0.20	0.15

Table 3

**APPENDIX III**

**Chevron U.S.A. Incorporated**  
**Hawaii Refinery**  
**NPDES Permit No. HI 0000329**

Effluent Limitations Calculations  
Chevron USA, Inc.,  
Hawaiian Refinery, Barber's Point  
NPDES Permit No.: HI 0000329

Basis: 56,400 BBL/day Crude Oil Throughput

Process	Capacity (1,000 bbl per stream day)	Capacity relative to throughput	Weighting Factor	Processing Configuration
Crude:		1.0		
Atmospheric	56.4	0.633		
Vacuum	35.7	1.0		
Desalting	56.4	2.633	X 1 =	2.633
Total		0.376		
Cracking and Coking:	21.2	0.376	X 6 =	2.256
Fluid Catalytic				
Total		0.007		
Asphalt:	0.40	0.007	X 12 =	0.084
Production				
Total			x 13 =	0.0
Lube:		0.0		
Total				
Reforming and		0.121		
Alkylation:	6.8	0.121	X 1 =	0.121
Sulfuric Acid				
Total				5.094
Process Configuration				

Size factor = 1.04 [40 CFR 419.23(b)(1) for 56,400 BBL/Day]  
Process factor = 0.88 [40 CFR 419.23(b)(2) for 5.094 Process Configuration]

b.2 BPT Limits: 40 CFR 419.22(a)

$$\text{Daily Average, lbs/day} = A \times B \times C_1 \times 56.4 \frac{\text{Kbbl feedstock}}{\text{day}}$$

$$\text{Daily Maximum, lbs/day} = A \times B \times C_2 \times 56.4 \frac{\text{Kbbl feedstock}}{\text{day}}$$

where:

A = Process factor, 0.88

B = Size factor, 1.04

 $C_1 = \text{BPT/BAT/BCT effluent limit daily average, } \frac{\text{lbs}}{\text{Kbbl feedstock}}$ 
 $C_2 = \text{BPT/BAT/BCT effluent limit daily maximum, } \frac{\text{lbs}}{\text{Kbbl feedstock}}$ 

Pollutant	$C_1$	30-Day Average (lbs/day)	$C_2$	Daily Maximum (lbs/day)
Phenols	0.036	1.858	0.074	3.820
Total Chromium	0.088	4.542	0.15	7.743
Hexavalent Chromium	0.0056	0.289	0.012	0.619

Basis: 56,400 BBL/day Crude Oil Throughput

c.1 BAT Limits: 40 CFR 419.23(a)

Pollutant	$C_1$	30-day Average (lbs/day)	$C_2$	Daily Maximum (lbs/day)
Ammonia	3.0	154.8	6.6	341
Sulfide	0.029	1.497	0.065	3.355

Basis: 56,400 BBL/day Crude Oil Throughput

Refinery process	Process feedstock rate, Mbbl/day
Atmospheric crude distillation	56.4
Vacuum crude distillation	35.7
Crude desalting	56.4
Total crude processes	= 148.5
Fluid catalytic cracking	21.2
Total cracking and coking processes	= 21.2
Asphalt production	0.40
Total asphalt processes	= 0.40
Total lube processes	= 0.0
Sulfuric acid alkylation	6.8
Total reforming and alkylation processes	= 6.8

---

Basis: 56,400 BBL/day Crude Oil Throughput

Pollutant	30-Day Average (lbs/day)	Daily Maximum (lbs/day)
<b>Phenols</b>		
$(0.003 \times 148.5) + (0.036 \times 21.2)$ $+ (0.019 \times 0.4) + (0.090 \times 0.0)$ $+ (0.032 \times 6.8) =$	1.43	
$(0.013 \times 148.5) + (0.147 \times 21.2)$ $+ (0.079 \times 0.4) + (0.0369 \times 0.0)$ $+ (0.132 \times 6.8) =$		5.98
<b>Total Chromium</b>		
$(0.004 \times 148.5) + (0.041 \times 21.2)$ $+ (0.022 \times 0.4) + (0.104 \times 0.0)$ $+ (0.037 \times 6.8) =$	1.72	
$(0.011 \times 148.5) + (0.119 \times 21.2)$ $+ (0.064 \times 0.4) + (0.299 \times 0.0)$ $+ (0.107 \times 6.8) =$		4.91
<b>Hexavalent Chromium</b>		
$(0.0003 \times 148.5) + (0.0034 \times 21.2)$ $+ (0.0019 \times 0.4) + (0.0087 \times 0.0)$ $+ (0.0031 \times 6.8) =$	0.14	
$(0.0007 \times 148.5) + (0.0076 \times 21.2)$ $+ (0.0041 \times 0.4) + (0.0192 \times 0.0)$ $+ (0.0069 \times 6.8) =$		0.286

Basis: 56,400 BBL/day Crude Oil Throughput

d.1. BCT Limits: 40 CFR 419.24(a)

Note: See formula on page III-2

Process factor = 0.88

Size factor = 1.04

Pollutant	C <sub>1</sub>	30-Day Average (lbs/day)	C <sub>2</sub>	Daily Maximum (lbs/day)
BOD <sub>5</sub>	5.5	284	9.9	511
TSS	4.4	227	6.9	356
Oil and Grease	1.6	83	3.0	155

Basis: 56,400 BBL/day Crude Oil Throughput

Effluent Limitations Calculations  
 Chevron USA, Inc.,  
 Hawaiian Refinery, Barber's Point  
 NPDES Permit No.: HI 0000329

Basis: 56,400 BBL/day Crude Oil Throughput

Process	Capacity (1,000 bbl per stream day)	Capacity relative to throughput	Weighting Factor	Processing Configuration
Crude:	56.4	1.0		
Atmospheric	35.7	0.633		
Vacuum	56.4	1.0		
Desalting		2.633	X 1 =	2.633
Total				
Cracking and Coking:	21.2	0.376		
Fluid Catalytic		0.376	X 6 =	2.256
Total				
Asphalt:	0.40	0.007		
Production		0.007	X 12 =	0.084
Total				
Lube:		0.0	x 13 =	0.0
Total				
Reforming and	6.8	0.121		
Alkylation:		0.121	X 1 =	0.121
Sulfuric Acid				
Total				5.094

Process Configuration

Size factor = 1.04 [40 CFR 419.23(b)(1) for 56,400 BBL/Day]  
 Process factor = 0.88 [40 CFR 419.23(b)(2) for 5.094 Process Configuration]

Discharge 001

b.2 BPT Limits: 40 CFR 419.22(a)

$$\text{Daily Average, lbs/day} = A \times B \times C_1 \times 56.4 \frac{\text{Kbbl feedstock}}{\text{day}}$$

$$\text{Daily Maximum, lbs/day} = A \times B \times C_2 \times 56.4 \frac{\text{Kbbl feedstock}}{\text{day}}$$

where:

A = Process factor, 0.88

B = Size factor, 1.04

C<sub>1</sub> = BPT/BAT/BCT effluent limit daily average,  $\frac{\text{lbs}}{\text{Kbbl feedstock}}$

C<sub>2</sub> = BPT/BAT/BCT effluent limit daily maximum,  $\frac{\text{lbs}}{\text{Kbbl feedstock}}$

Pollutant	C <sub>1</sub>	30-Day Average (lbs/day)	C <sub>2</sub>	Daily Maximum (lbs/day)
Phenols	0.036	1.858	0.074	3.820
Total Chromium	0.088	4.542	0.15	7.743
Hexavalent Chromium	0.0056	0.289	0.012	0.619

Basis: 56,400 BBL/day Crude Oil Throughput

c.1 BAT Limits: 40 CFR 419.23(a)

Pollutant	C <sub>1</sub>	30-day Average (lbs/day)	C <sub>2</sub>	Daily Maximum (lbs/day)
Ammonia	3.0	154.8	6.6	341
Sulfide	0.029	1.497	0.065	3.355

Basis: 56,400 BBL/day Crude Oil Throughput



Refinery process	Process feedstock rate, Mbbl/day
Atmospheric crude distillation	56.4
Vacuum crude distillation	35.7
Crude desalting	56.4
Total crude processes	= 148.5
Fluid catalytic cracking	21.2
Total cracking and coking processes	= 21.2
Asphalt production	0.40
Total asphalt processes	= 0.40
Total lube processes	= 0.0
Sulfuric acid alkylation	6.8
Total reforming and alkylation processes	= 6.8

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Basis: 56,400 BBL/day Crude Oil Throughput

Pollutant	30-Day Average (lbs/day)	Daily Maximum (lbs/day)
<b>Phenols</b>		
$(0.003 \times 148.5) + (0.036 \times 21.2)$ $+ (0.019 \times 0.4) + (0.090 \times 0.0)$ $+ (0.032 \times 6.8) =$	1.43	
$(0.013 \times 148.5) + (0.147 \times 21.2)$ $+ (0.079 \times 0.4) + (0.0369 \times 0.0)$ $+ (0.132 \times 6.8) =$		5.98
<b>Total Chromium</b>		
$(0.004 \times 148.5) + (0.041 \times 21.2)$ $+ (0.022 \times 0.4) + (0.104 \times 0.0)$ $+ (0.037 \times 6.8) =$	1.72	
$(0.011 \times 148.5) + (0.119 \times 21.2)$ $+ (0.064 \times 0.4) + (0.299 \times 0.0)$ $+ (0.107 \times 6.8) =$		4.91
<b>Hexavalent Chromium</b>		
$(0.0003 \times 148.5) + (0.0034 \times 21.2)$ $+ (0.0019 \times 0.4) + (0.0087 \times 0.0)$ $+ (0.0031 \times 6.8) =$	0.14	
$(0.0007 \times 148.5) + (0.0076 \times 21.2)$ $+ (0.0041 \times 0.4) + (0.0192 \times 0.0)$ $+ (0.0069 \times 6.8) =$		0.286

Basis: 56,400 BBL/day Crude Oil Throughput

d.1. BCT Limits: 40 CFR 419.24(a)

Note: See formula on page III-2

Process factor = 0.88

Size factor = 1.04

Pollutant	C <sub>1</sub>	30-Day Average (lbs/day)	C <sub>2</sub>	Daily Maximum (lbs/day)
BOD <sub>5</sub>	5.5	284	9.9	511
TSS	4.4	227	6.9	356
Oil and Grease	1.6	83	3.0	155

Basis: 56,400 BBL/day Crude Oil Throughput

n 11, 1995, 10:18:30 L-N PROGRAM PLUMES, Jun 1 1993 Case: 2 of 2  
 tle Chevron Refinery: Minimum Dilution, 3.943 mgd, 4 ft spacing non-linear  
 ot flow # ports port flow spacing effl sal effl temp far inc far dis  
 0.1728 16 0.01080 1.219 25.0 23.89 100 2000  
 ort dep port dia plume dia total vel horiz vel vertl vel asp coeff print frq  
 5.486 0.07620 0.06816 2.960 2.960 0.000 0.10 500  
 rt elev ver angle cont coef effl den poll conc decay Froude # Roberts F  
 0.6096 0.0 0.8 16.1661 0.000026 0 47.04 1.086E-13  
 r angle red space p amb den p current far dif far vel K:vel/cur Stratif #  
 90 1.219 22.1870 1e-5 0.00045 0.1524 296000 0.000  
 depth current density salinity temp amb conc N (freq) red grav.  
 0.0 22.1870 33.0 23.89 0.0 0.000 0.05811  
 6.0 22.1870 33.0 23.89 0.0 buoy flux puff-ther  
 0.0006276 54.61  
 jet-plume jet-cross  
 3.018 17880  
 plu-cross jet-strat  
 6.276E+11  
 plu-strat

hor dis>=

RMIX1 flow category algorithm is turned off.

0.0 to any range

lp: F1. Quit: <esc>. Configuration: ATNO0. FILE: CHEVRON.VAR;  
 INITIAL DILUTION CALCULATION (non-linear mode)

plume dep	plume dia	poll conc	dilution	hor dis
m	m			m
5.486	0.06816	0.00002600	1.000	0.000
5.292	1.235	1.415E-06	18.28	2.926 -> merging
3.563	2.461	8.125E-07	31.82	6.574
0.8715	3.145	6.158E-07	41.98	9.024 -> surface hit

RFIELD CALCULATION (based on Brooks, 1960, see guide)

rfield dispersion based on wastefield width of 21.43m

--4/3 Power Law--				--Const Eddy Diff--		Time	
conc	dilution	conc	dilution	distance	m	sec	hrs
5.563E-07	46.5	5.802E-07	44.6	100.0	597.0	0.2	
5.222E-07	61.3	4.987E-07	51.9	200.0	1253	0.3	
5.269E-07	79.3	4.383E-07	59.1	300.0	1909	0.5	
5.618E-07	99.1	3.944E-07	65.7	400.0	2565	0.7	
5.155E-07	120.4	3.612E-07	71.7	500.0	3222	0.9	
5.814E-07	143.1	3.351E-07	77.3	600.0	3878	1.1	
5.554E-07	167.1	3.138E-07	82.6	700.0	4534	1.3	
5.350E-07	192.3	2.961E-07	87.6	800.0	5190	1.4	
5.188E-07	218.7	2.811E-07	92.2	900.0	5846	1.6	
5.055E-07	246.2	2.682E-07	96.7	1000	6502	1.8	
5.459E-08	274.6	2.569E-07	101.0	1100	7159	2.0	
5.541E-08	304.2	2.468E-07	105.1	1200	7815	2.2	
5.762E-08	334.7	2.379E-07	109.0	1300	8471	2.4	
5.095E-08	366.2	2.299E-07	112.9	1400	9127	2.5	
5.518E-08	398.7	2.226E-07	116.5	1500	9783	2.7	
5.015E-08	432.0	2.160E-07	120.1	1600	10440	2.9	
5.574E-08	466.2	2.100E-07	123.6	1700	11100	3.1	
5.184E-08	501.3	2.044E-07	127.0	1800	11750	3.3	
4.838E-08	537.2	1.992E-07	130.3	1900	12410	3.4	
4.528E-08	573.9	1.944E-07	133.5	2000	13060	3.6	